Regional gazelles and lions as creative creatures

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REGIONAL GAZELLES AND LIONS AS CREATIVE CREATURES

A META-MULTICRITERIA ANALYSIS OF INNOVATION AND GROWTH POTENTIALS OF EUROPEAN REGIONS

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"*Every morning in Africa, a gazelle wakes up.*
It knows it must run faster than the fastest lion or it will be killed.
Every morning a lion wakes up.
It knows it must outrun the slowest gazelle or it will starve to death.
It doesn't matter whether you are a lion or a gazelle.
When the sun comes up, you better start running".

(Th. L. Friedman, 2007, p. 137)

Abstract

Creative regions are nowadays seen as strategic areas for a fierce – and often global – competition. This paper aims to provide an operational assessment framework for judging the innovation potential of competing regions on the basis of indicators that mirror the indigenous regional creative resources. Various evaluation methods are proposed to assess this innovation potential, on the basis of a set of 9 regions in Europe. The robustness of the findings is tested by applying a meta-multicriteria analysis.

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1. Gazelles and Lions: Regions as Predators or Preys

Our world is changing in a breath-taking pace. Nation-states tend to lose their importance in favour of regions or clusters of regions. And modern ever-growing cities have become the home of mankind and of business, instigated by the presence of unprecedented agglomeration advantages. They have expanded into urban regions with a significant rise in action radius, but still with a strong orientation towards urban life styles and cultures. These areas have in several countries moved into 'melting pots' of individual life styles and varied cultures. They are not only becoming bigger in size and scale, but also show a clear tendency towards demographic, economic, social and cultural heterogeneity. Furthermore, while a few decades ago small villages in peripheral and rural areas were oases of quiet and relaxed life, nowadays global forces marked by individualistic and urban life styles and by geographical openness and economic competitiveness also have penetrated the territory of human settlements located in isolated spaces. In this context, modern ICT has meant a radical breakthrough in the seemingly peaceful past of remote localities and regions (cf. Acs and Audretsch 2003, Helpman 2004). Even in non-urbanized and distant places we witness nowadays town councils talking about creative classes and industries, about distance learning and e-democracy, or about the changing force field caused by China's vigorous innovation policy.

An intriguing question is whether the melting pot phenomenon (i.e., a spatial concentration of cultural and social diversity) is a benefit or a burden for modern urban regions (cf. Jacobs 1969). The recent literature on creative classes, creative industries and creative cities adopts a positive perspective, as creative minds may stimulate innovative activities and economic growth. But which are the driving forces and the critical success conditions for accelerated socio-economic progress of urban regions? In his recent book '*The World is Flat*', Thomas Friedman (2007) offers a challenging description of the dramatic changes in our world. He argues that we have now entered the third globalization wave: the first one started with the age of the great international geographic discoveries from the fifteenth century onward until the Napoleonic time and was concerned with the new positioning of countries in a global integration; the second wave lasted until the turn of the last century and heralded the advent of multinational business and international trade as a key force for economic progress; and finally, the third wave started about a decade ago, when after the global connectivity of countries and companies also individuals and households started to acquire a global orientation ('global citizenship'). Modern ICT has led to a shrinkage of our world, where in a few seconds we may in principle be connected with any other individual on any other place in the world.

Friedman also gives an interesting record of the various forces that govern our modern world, such as the political globalization, the network revolution, the compelling global power of software, the drive towards self-organizing communities, the global outsourcing and off-shoring movement, and so forth. One thing is clear: our open world is not only globalizing, but is also moving to a radical form of economic competition, which drives economic efficiency and wealth. Countries are no longer the appropriate territories for path-breaking and innovative initiatives; it is the regions that are becoming the new force field. They embody the knowledge potential, the human and social capital and the creative initiatives that are needed – and make them fit – for a flexible participation in global networks.

Recently, Saxenian (2006) introduced the concept of 'new argonauts' to refer to the new innovative players in the business market. In other parts of the literature, it has become customary to use the metaphor of gazelles to illustrate that highly creative and innovative regions may become the fast forerunners of new and unprecedented techno-economic developments. Others are inclined to refer to regions as lions which have to demonstrate their intrinsic economic and geo-political power to become winners in a global force field of vigorous competition. Whether regions are to be seen as gazelles or lions is perhaps less interesting than the question of their flexible adjustment potential to new global and local challenges. Probably the most important task of a region is to generate 'fit-for-purpose' initiatives on the basis of a 'challenge and reponse' strategy (see Toynbee 1947), as at the end in a competitive system of regions adherence to the Darwinian 'survival of the fittest' paradigm will be decisive. The future of regions seems to depend on 'smart behaviour', so that 'survival of the smartest' tends to become a new success paradigm for business and governments. In this context, innovative behaviour (the search for new, necessary and focussed ideas, goods or processes) is a sine qua non. But at the same time, there is a need for creative initiatives focussing on original, non-standardized and unanticipated concepts and designs of a non-blueprint nature. This will become a new challenge for urban regions.

But can we identify which regions have the highest probability to become an economic winner? Baum et al. (2001) have identified five such critical success conditions for highly-performing regions or industries, viz. human capital (e.g., cognitive skills), social capital (e.g., accessible and institutionalized networks), knowledge capital (e.g., R&D structures and results), financial capital (e.g., venture capital) and entrepreneurial capital (e.g., smart initiatives or business leadership) (see also van Praag 2005, Shane 2003). The latter three categories are sometimes also summarized under the heading of 'creative capital'. The spatially coherent and integrative set of these capital endowments is sometimes referred to as 'territorial capital'.

2. Regional Creative Resources

Regions may thus be considered to offer potentially creative resources that may enhance the total factor productivity of all agents concerned, both private and public, as these resources will stimulate innovation in a broad sense. Thus, resource diversity may be seen as an explanatory factor for differences in regional performance and growth potential (e.g., income growth per capita, labour force participation). These resources may be divers in nature, caused by factors, such as: geographical accessibility, locational advantages, sense of entrepreneurship and leadership, innovative attitude, risk-seeking or opportunity-seeking behaviour, knowledge intensity, ethnic-demographic diversity, and so forth. Thus, we assume that resource-rich regions will be prompted to be more creative and to be better performers than less privileged regions with a lower territorial capital intensity.

Furthermore, availability and use of productive regional resources is not an exogenously given phenomenon, but may be influenced by deliberate policy actions, such as infrastructure policy (e.g., roads, railways), suprastructure policy (e.g., knowledge investments, education, R&D policy, industrial leadership) or institutional policy (e.g., participatory and responsive modes of public policy). The theoretical foundations for this line of thinking can be found in various recent paradigms, such as the regional endogenous growth theory, the new economic geography approach, the innovation and entrepreneurship approach, or the creative class literature (see e.g., Capello and Nijkamp 2008). The general finding from the recent literature is that regions are to a large extent determinants of their own 'fate'.

We will deploy in our study the notion of *creative resources* as a concept that represents the set of relevant factors that stimulates the creation of new opportunities and/or innovations in a region at the interface of the public, the private and the knowledge domain (the Triple Helix). This may be mapped out by a multidimensional innovativeness square or creativity 'piazza' (see in particular Figure 1), which represents in a systematic manner the complex force field involved. The idea of this 'piazza' is that all forces inducing the creative use of smart infrastructure come in a consistent way together – from different directions and orientations – and find their concentration point in a spatially-integrated force field that enhances competitive capacities of regions or cities.

In the recent literature on regional growth various contributions can be found that support the above ideas. Examples are the FIRES-Qware model developed by Nijkamp (2007), the leadership and organizing capacity approach development by Stough (2005), or the smart infrastructure model developed by Smilor and Wakelin (1990).

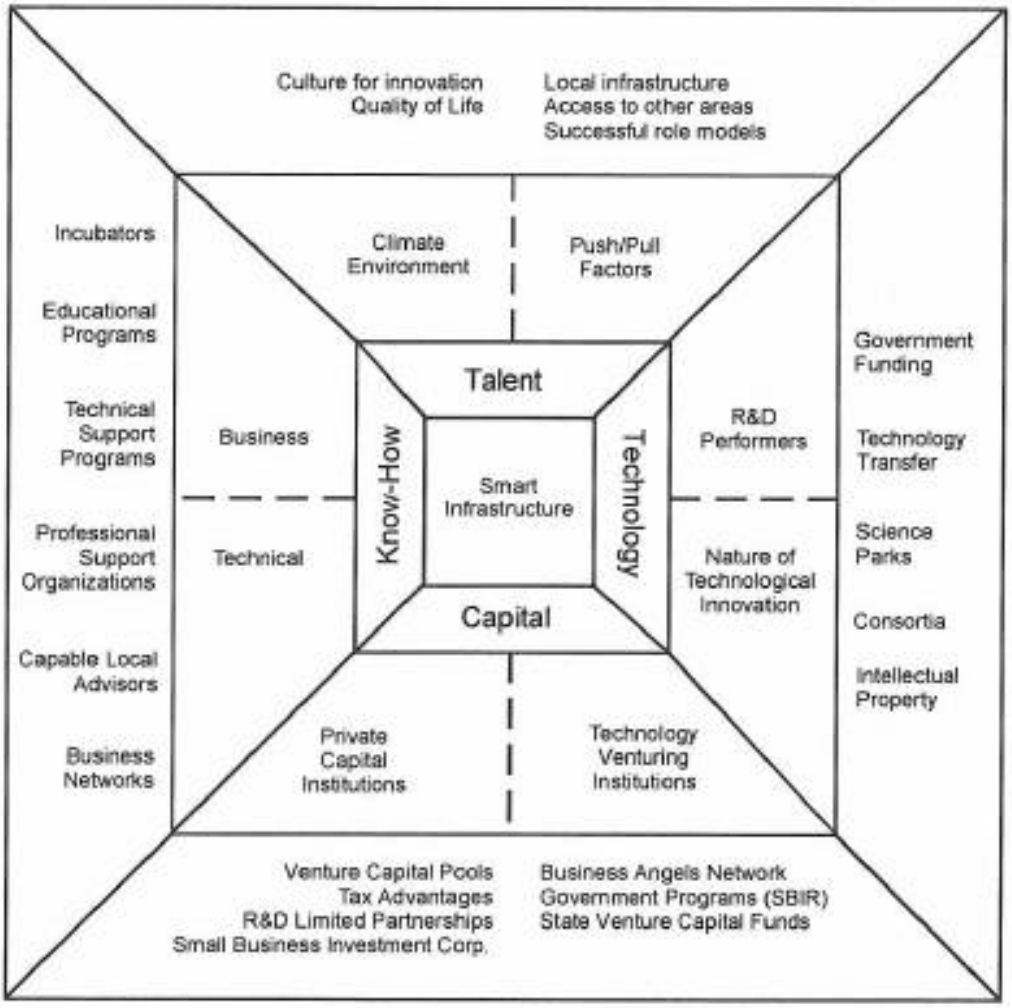

Figure 1. The Innovativeness Square (or Creativity 'Piazza')

The socio-economic success of regions (in terms of GDP or growth) will in general depend on their access to and exploitation of a portfolio of creative resources. Spatial disparities may then be explained from the presence of diversity in the creative resources of the regions under consideration. Clearly, regions nowadays are involved in a competitive battle concerning creative resources, as their competitive advantage is determined by their innovation potential incorporated in these creative resources. To assess the competitive advantage of regions (see Porter 1990), it is necessary to map out in a quantitative sense the indicators that shape these creative resources of a region. This is a necessary step for any benchmark study or comparative investigation of the performance of regions. Such 'creative resource indicators' (abbreviated as CRIs) should be transparent, manageable, testable, comparable, representative and policy-

relevant, while they should be manageable in number. We will distinguish in our comparative empirical case study 7 such CRIs for each region considered here:

- public R&D (in particular, institutions for higher education);
- private R&D (in particular, research institutes or laboratories);
- talent (students, researchers) (in particular, share of students in higher education);
- public investments (in particular, budget share for innovation);
- private investment (in particular, private investments for innovation);
- entrepreneurship (incubators, science parks);
- organizing capacity (leadership, trust).

Quantitative assessment of such CRIs will allow us to undertake a consistent comparison of the strength and weakness of each actor (i.e., region) concerned. In a succinct way the factors behind these CRIs are presented in Figure 2 as a regional Creative Resource Complex.

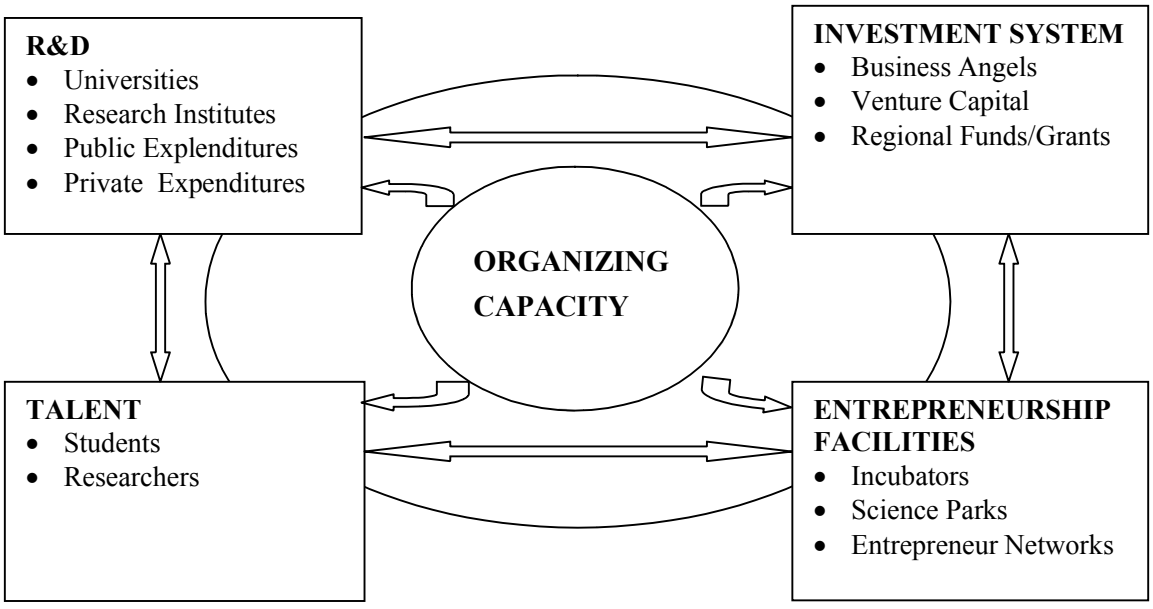

Figure 2. The Creative Resource Complex of a Region

The elements of this creative resource complex comprise mainly four classes of stakeholders for regional innovation and development, viz. the business sector, governments (local and regional), education and training institutions, and R&D institutions. An important constituent of Figure 2 and an essential driver of innovative activity is formed by the region's organizing capacity, such as informal networks which create synergy and trust at the regional

level. Figure 2 may be seen as a generalization of the Triple Helix model and aims to offer an empirical test model.

In our comparative study on the creativeness and innovativeness of (mainly industrialized and urban) regions in Europe, we have selected the following 9 urbanized regions:

1. Stockholm (SE)
2. Etelä-Suomi (Helsinki, Turku, Espoo, Vantaa) (FI)
3. Karlsruhe (Karlsruhe, Heidelberg, Mannheim, Pforzheim) (DE)
4. Ile de France (Paris, Versailles, Melun) (FR)
5. South East (Berkshire, East Sussex, Surrey) (UK)
6. Midi Pyrénées (Toulouse, Montauban, Tarbes) (FR)
7. Vlaams Gewest (Leuven, Antwerp, Ghent, Mechelen) (BE)
8. Zuid-Holland (The Hague, Rotterdam, Leiden) (NL)
9. Noord-Brabant (Eindhoven, Breda, 's-Hertogenbosch) (NL)

The data on these regions were collected from the European Regional Innovation Scoreboard (2006) which contains a rich information base on 208 regions in Europe. We have made a preselection of 9 regions on the base of similarities in their competiveness profiles, while also some balance among different countries in Western Europe is strived for. Further information was obtained from interviews with various stakeholders in this area (see also Technopolicy Network 2007). More details on the 9 regions considered can be found in Annex I. In the next section we will describe the methodology used in our study.

3. Methodology and Results

In our comparative study on the creativeness and innovativeness potential of 9 Western-European regions we have deployed two methodological approaches:

- An exploratory approach which maps out the relative strengths and weaknesses in the CRIs in each of the regions, using the so-called Multidimensional Spider Model (MSM).
- A normative approach which aims to identify a ranking of the regions under consideration on the basis of multi-criteria analysis (MCA) using the so-called Regime Method (see, e.g., Nijkamp et al. 1992).

We will briefly describe these two steps of our methodology, which are successively applied.

The MSM is based on an organized data representation of the 7 CRIs for each of the 9 regions at hand. It aims to offer a visual representation of all data in 7 dimensions using the Spider technique, sometimes also called the Amoebe method (see for details Nijkamp et al.

1994). Empirical illustrations of this MSM approach for each individual region can be found in Annex II.

Next, the results of the Spiders can also succinctly be represented in a qualitative survey table (sometimes also called impact matrix), which forms the basis for an MCA (see Table 1).

The next step of the methodology is based on an MCA approach. The relative positions of each of the 9 regions on the basis of their scores as indicated in the Spiders (see Annex II) were identified using different qualitative methodological angles, in particular:

- The TPN-index
- The RIS-index
- The RVA-index
- The WSM-index
- The Regime-index

Table 1. An Ordinal Survey Table of Regional CRIs

	CRIs						
Regions	**Public R&D**	**Private R&D**	**Talent**	**Public Investments**	**Private Investments**	**Entrepreneurial Facilities**	**Organizing Capacity**
1. Stockholm	4	4	5	2	4	2	2
2. Etelä-Suomi	2	3	5	2	1	4	2
3. Karlsruhe	4	2	1	2	2	4	2
4. Ile de France	2	2	4	2	4	2	2
5. South East	1	2	4	2	4	4	3
6. Midi Pyrénées	2	2	1	2	2	1	1
7. Vlaams Gewest	2	1	1	2	2	1	2
8. Zuid-Holland	4	1	1	2	2	2	1
9. Noord-Brabant	1	2	1	1	1	1	2

Legend: 5 = significantly higher than average
4 = above average
3 = slightly above average
2 = about average
1 = below average

We will concisely describe now the meaning of these indices and their use in our comparative analysis.

The TPN-index is based on a series of structured interviews with representatives of stakeholders in each of the 9 regions at hand, using regional information and insights against the background of the data included in Table 1. This led to an ordinal ranking of the 9 regions (see column 1 in Table 2).

The RIS-index stems from information obtained from the European Regional Innovation Scoreboard (2006) generated by MERIT in Maastricht. This ranking is given in column 2 in Table 2.

Next, the RVA-index represents the regional value added as obtained from statistical sources in each of the regions, and is given in column 3 in Table 2.

The WSM-index is based on a weighted summation method. This is essentially a simplistic MCA method (in our case all CRI indicators were supposed to have an equal importance). These results are given in column 4 in Table 2.

And finally, the Regime-index is based on an advanced MCA-model called Regime analysis and offers a sophisticated ranking (and rating) of the performance of each individual region, using Table 1 as the input for an unweighted MCA (see for details on the Regime analysis, Nijkamp et al. 1992). The regime outcomes can be found in column 5 in Table 2.

Table 2. Results of regional rankings on the basis of 5 ranking methods and of the meta-MCA

Regions	**TPN**	**RIS**	**RVA**	**WSM**	**Regime**	**Meta**
1. Stockholm	9	9	9	9	9	9
2. Etelä-Suomi	7	8	8	8	7	8
3. Karlsruhe	5	7	7	6	6	7
4. Ile de France	6	6	6	5	8	6
5. South East	8	5	5	7	6	5
6. Midi Pyrénées	3	4	3	3	1	4
7. Vlaams Gewest	2	3	2	2	2	3/2
8. Zuid-Holland	4	2	1	4	6	3/2
9. Noord-Brabant	1	1	4	1	3	1

All these 5 indices are given in the first 5 columns of Table 2. It should be noted that most results are rather robust. Stockholm scores everywhere very high, while Noord-Brant has a low performance.

It is noteworthy now that Table 2 essentially is a new survey table (or impact matrix). But in this case, it does not represent the regional performance results in terms of CRIs, but the relative position of each region on the basis of 5 different ranking models. Thus, this table can essentially be used as the basis for a 'meta-MCA' in order to identify whether the systematic and multidimensional combination of 5 different ranking methods leads to some overall ranking of the creativity (or innovativeness) potential of these regions. Therefore, we have applied once more the Regime method to the first 5 columns of Table 2. These ranking results are now given in the 6th column of Table 2, denoted by the column Meta.

All these results show rather robust results. The winners appear to have a rather consistent position in all assessment methods, whereas also the losers (the lower set of 4 regions) have also a rather consistent position, albeit with some more variation in their relative position.

4. Concluding Remarks

This paper is written in the spirit of the current creativeness fashion. Creative regions are nowadays seen as strategic areas for a fierce – and often global – competition. This paper aims to provide an operational assessment framework for judging the innovation potential of competing regions on the basis of indicators that mirror the indigenous regional creative resources. Various evaluation methods are proposed to assess this innovation potential, on the basis of a set of regions in Europe. The robustness of the findings is tested by applying a meta-multicriteria analysis.

The force field of international competitiveness is increasingly shifted from the national level towards the regional level. Regions are becoming spearheads of innovation, competition and creativeness. In our study we have compared 9 regions in Western Europe. All of them have a strong knowledge base, a strong industrial tradition, and a sense of entrepreneurship. Nevertheless, their economic performance shows striking differences.

Based on a multidimensional Creative Resource Indicators approach, we have tried to map out various performance variables. Using different assessment methods – ranging from simple to sophisticated ones – we have tried to analyze this complex force field. We have also tested the robustness of our findings by means of a so-called meta-multicriteria analysis based on the Regime method.

Our conclusions are rather straightforward: the Nordic regions are strong players in a European context, whereas many others have a less convincing position. Geographic size is of course an important agglomeration force, but accessibility in terms of international interaction (like in the case of Noord-Brabant) may be an important explanatory factor. Also the economic history of a region (path dependency) is likely to have a significant impact.

We conclude that the competitiveness arena of regional actors in Europe displays much variation, with great opportunities to obtain a strong position through a smart mix of a proper knowledge base, R&D initiatives, private sector action and supporting public sector policies. A strong interface between public R&D and creative research talent pools seems to be a critical success factor, in particular of this interface is facilitated by smart local or regional growth initiatives.

Finally, we have to add that the current investigation in this paper is based on a static cross-section comparison. Future work should also look at the dynamics of regional systems, by addressing the rate of change of the various GRIs in these regions so as to map out also the evolution of the areas under consideration.

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Annex I Data on the 9 Regions under Consideration[1]

1. Stockholm

The region of Stockholm (Stockholms Län) is one of the provinces in Sweden. It has the following characteristics:

- Population size: 1.9 mln inhabitants (> 1/5 of population country)
- Population density: 293 inhab./km^2
- Area size: 6488 km^2
- Gross Regional Product: € 80.4 bln, € 43,000 per capita (highest in Sweden)

The capital of Stockholm is also located in this region. Most people in the region are living in the city of Stockholm (777,000 inhabitants). Also, the national government is based in Stockholm. Actors for regional innovation are: Innovationsbron (Innovationbridge), universities such as the Karolinska Institute, the Royal Institute of Technology and Stockholm University, and large companies such as Eriksson, Scania and Astrazeneca (pharmaceuticals).

2. Etelä-Suomi (Uusimaa)

The region of Etelä-Suomi is one of the provinces in Finland. The urbanized area Uusimaa is one of the regions in Etelä-Suomi. Uusimaa has the following characteristics:

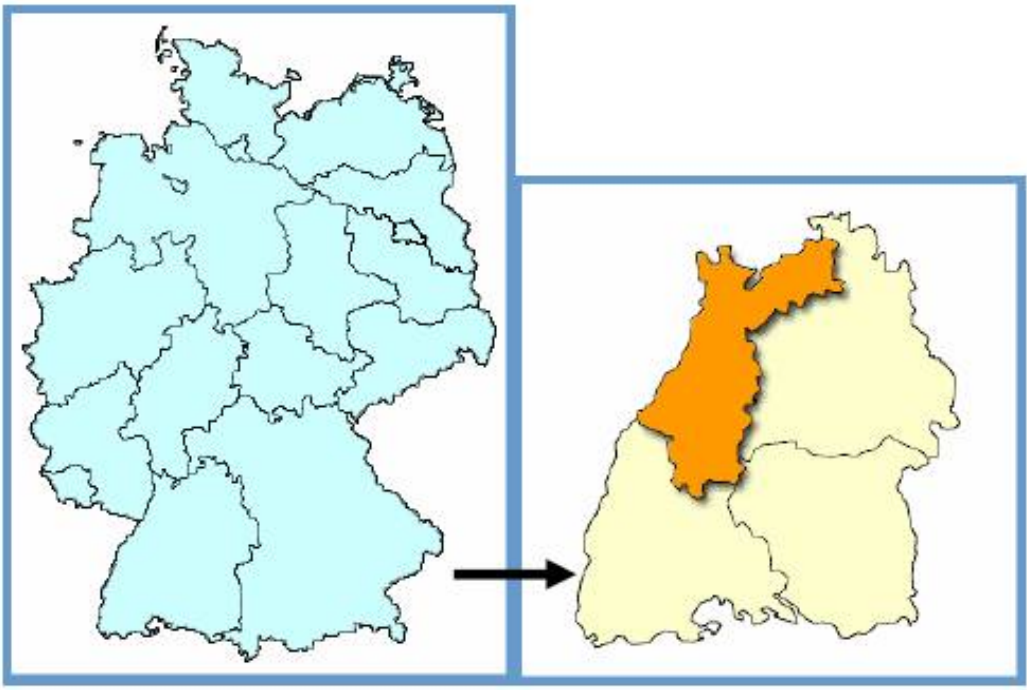
- Population size: 1.3 mln inhabitants (2.6 mln inhabitants in Etelä-Suomi)
- Population density: 204 inhab./km^2
- Area size: 6366 km^2
- Gross Regional Product: € 86.4 bln, € 34,000 per capita (both figures for Etelä-Suomi)

The largest part of the added value in the region is earned though industry, closely followed by the business services and public services sector. There are three large cities in Uusimaa: Helsinki (560,000) inhabitants), Vantaa and Espoo. Helsinki is the capital of Finland; the seat of the national government is located in this city. The three large cities work closely together for regional innovation. Other important actors are the University of Helsinki and Culminatum. The main driver for many innovative processes in

[1] For a full record of all data, see Technopolicy Network (2007).

the region is Nokia (located in Espoo). Furthermore, the regions hosts Europe's largest incubation organization called Technopolis Ventures.

3. Karlsruhe



The region of Karlsruhe in German, a so-called Regierungsbezirk, is a subregion of the State of Baden-Württemberg. The characteristics of the region are:

- Population size: 2.7 mln inhabitants, 10.7 mln in Baden-Württemberg
- Population density: 395 inhab./km^2
- Area size: 6919 km^2
- Gross Regional Product: € 84.5 bln, € 31,000 per capita

Several large cities in the area are Karsruhe (283,000 inhabitants), Mannheim (308,000 inhabitants), Heidelberg (142,000 inhabitants) and Pforzheim (119,000 inhabitants). Around the city of Karlsruhe is the *Technologieregion Karlsruhe,* while Heidelberg and Mannheim are in the *Metropolregion Rhein-Neckar*. This is a region that covers parts of three states: Baden-Württemberg, Hessen and Rheinland-Pfalz. The two regions also have a different focus in terms of clusters: The Technologieregion Karlsruhe is mostly focused on automotive and software, while the Metropolregion is mainly specialized in biotech. Important actors for regional innovation are: the city of Karlsruhe, the University of Karlsruhe, the University of Heidelberg, Research Centre Karlsruhe, and large companies such as SAP and BASF.

4. Ile de France

The region of Ile-de-France has the following characteristics:

- Population size: 11.3 mln inhabitants
- Population density: 957 inhab./km^2
- Area size: 12 012 km^2
- Gross Regional Product: € 469 bln (> 1/4 of national GDP), € 41,000 per capita

The largest city in Ile-de-France is the capital Paris (2 million inhabitants), but there are also other large cities such as Versailles. The region is known for the presence of powerful clusters: biotech, photonics, space & aviation, automotive (Renault & Peugeot/Citroën) and telecommunication. Important actors for regional innovation are: the counties, universities, and large incubator and science park programmes such as Genopole.

5. South-East (UK)

The South-East is an L-shaped region located around London. It has the following characteristics:

- Population size: 8.1 mln inhabitants
- Population density: 419 inhab./km^2
- Area size: 19.096 km^2
- Gross Regional Product: € 254 bln, € 31,000 per capita

The region consist of four sub-regions: Kent, Hampshire & Isle of Wight, Surrey & East and West Sussex and Berkshire, Buckinghamshire & Oxfordshire. Important actors for regional innovation are: SEEDA and the University of Oxford.

6. Midi-Pyrénées

The region of Midi-Pyrénées is also one of the regions in France. It has the following characteristics:

- Population size: 2.7 mln inhabitants
- Population density: 56 inhab./km^2
- Area size: 45 348 km^2
- Gross Regional Product: € 64.5 bln, € 24,000 per capita

The largest city in the region is Toulouse (437,000 inhabitants). The region is known for the aeronautics cluster. Important actors for regional innovation are: local and regional governments, and large corporate organizations like Airbus and the University of Toulouse. Like Ile-France, the largest share of the value added is earned by the financial services sectors, although less dominant than in the former. Next to financial services, the public services sector has the highest value added.

7. Vlaams Gewest

The region of Vlaams Gewest is one of the three regions in Belgium. The area coincides with Flanders, except for the fact that the city of Brussels is not included in Vlaams Gewest. It has the following characteristics:

- Population size: 6 mln inhabitants
- Population density: 444 inhab./km^2
- Area size: 13 521 km^2
- Gross Regional Product: € 165.8 bln, € 28,000 per capita

There are several large cities in the region: Antwerpen (446,000 inhabitants), Leuven (92,000 inhabitants) and Gent (235,000 inhabitants). Important actors for regional innovation are: research institutes such as IMEC, the University of Leuven, and large companies such as Johnson & Johnson.

8. Zuid-Holland

The province of Zuid-Holland has the following characteristics:

- Population size: 3.5 mln inhabitants
- Population density: 1225 inhab./km^2
- Area size: 2818 km^2
- Gross Regional Product: € 106.2 bln, € 31,000 per capita

There are several large cities in the region: Rotterdam, The Hague, Leiden and Delft. Important actors for regional innovation are the three universities in Rotterdam, Leiden and Delft, the 'juridical' cluster in the Hague, the presence of active municipalities within the region and head offices of large multinationals.

9. Noord-Brabant

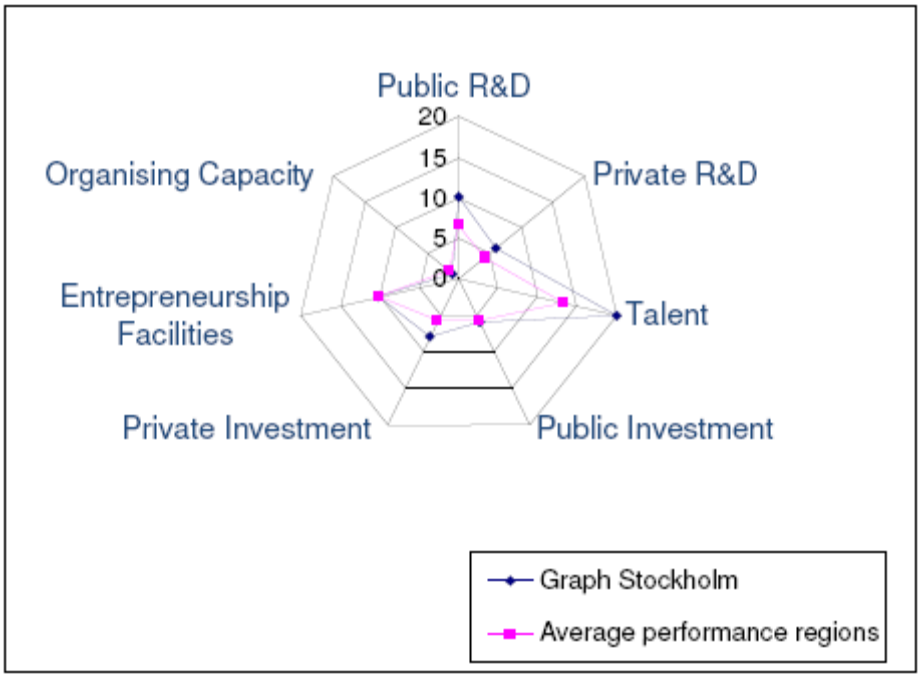
The province of Noord-Brabant has the following characteristics:

- Population size: 2.4 mln inhabitants
- Population density: 491 inhab./km^2
- Area size: 4919 km^2
- Gross Regional Product: € 72.4 bln, € 30,000 per capita

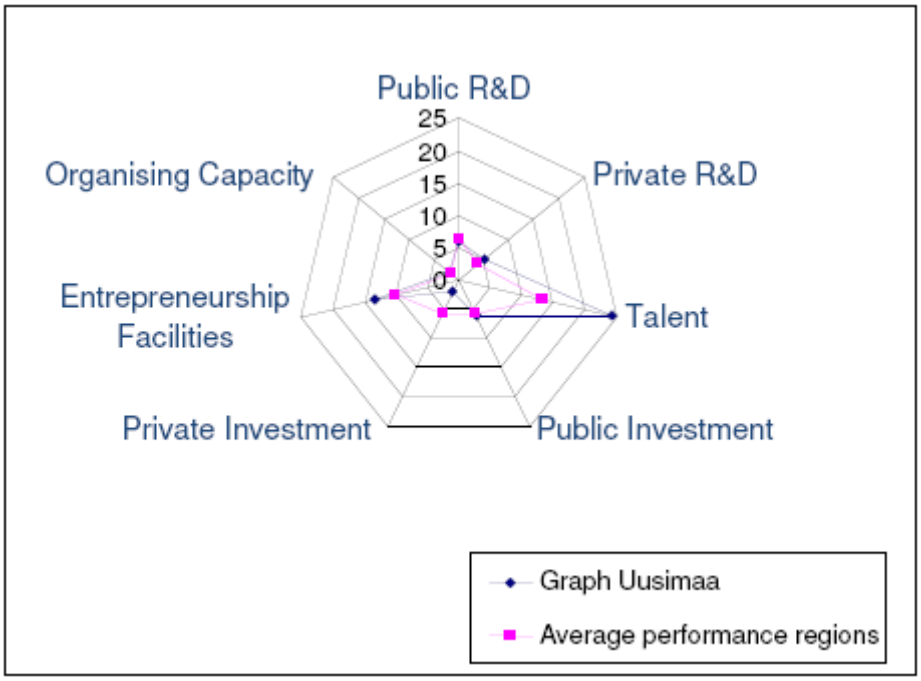
There are several medium-size to large cities in the region: 's-Hertogenbosch, Eindhoven, Tilburg. Important actors for regional innovation are: the Technical University of Eindhoven, the Economic Development Agency of Noord-Brabant (BOM) and large companies such as Philips and ASML. The largest share of value added is earned in the industry sector, closely followed by the financial services, business services and public services sector.

Annex II Results for the 9 Regional Spiders[2]

1. Stockholm

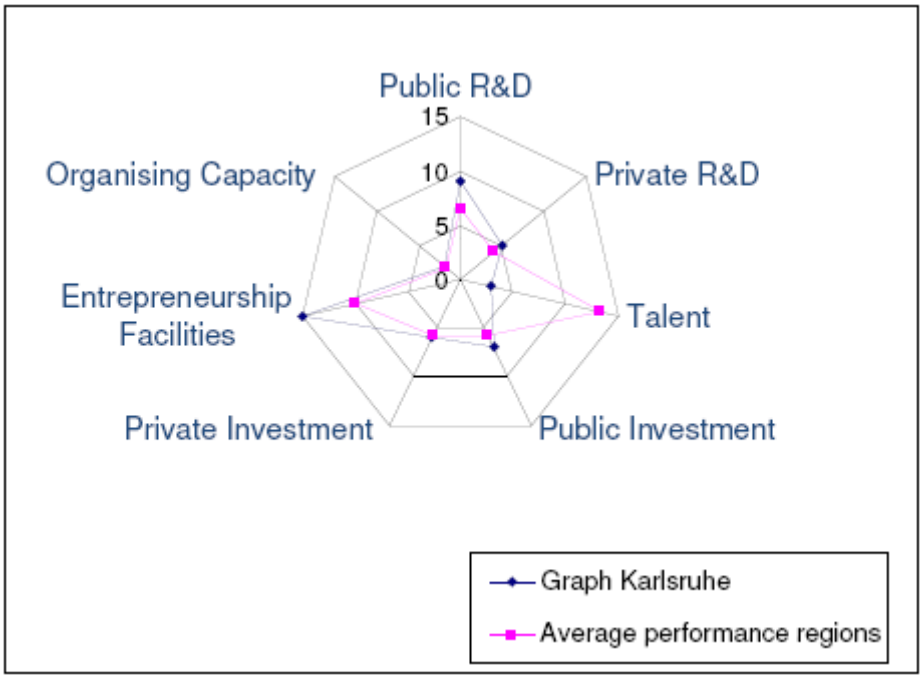


2. Etelä-Suomi (Uusimaa)

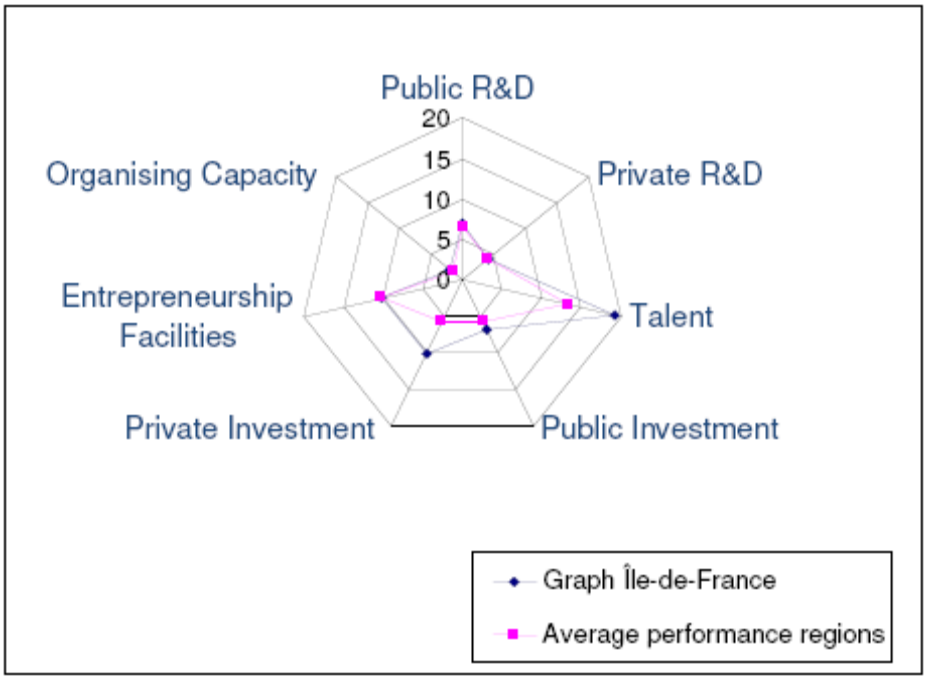


[2] See for more detail also Technopolicy Network (2007)

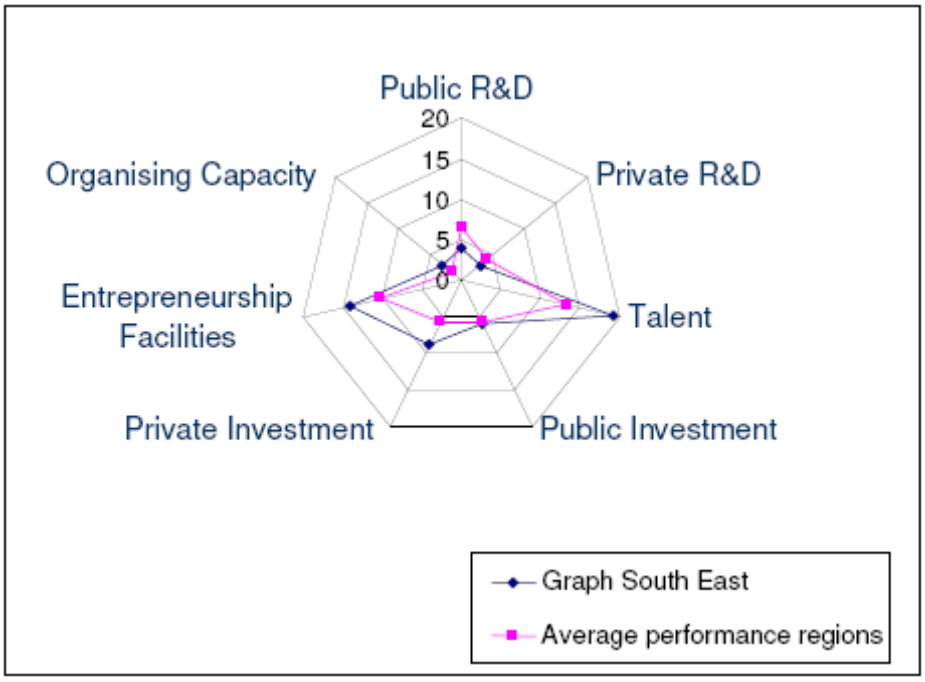
3. Karlsruhe



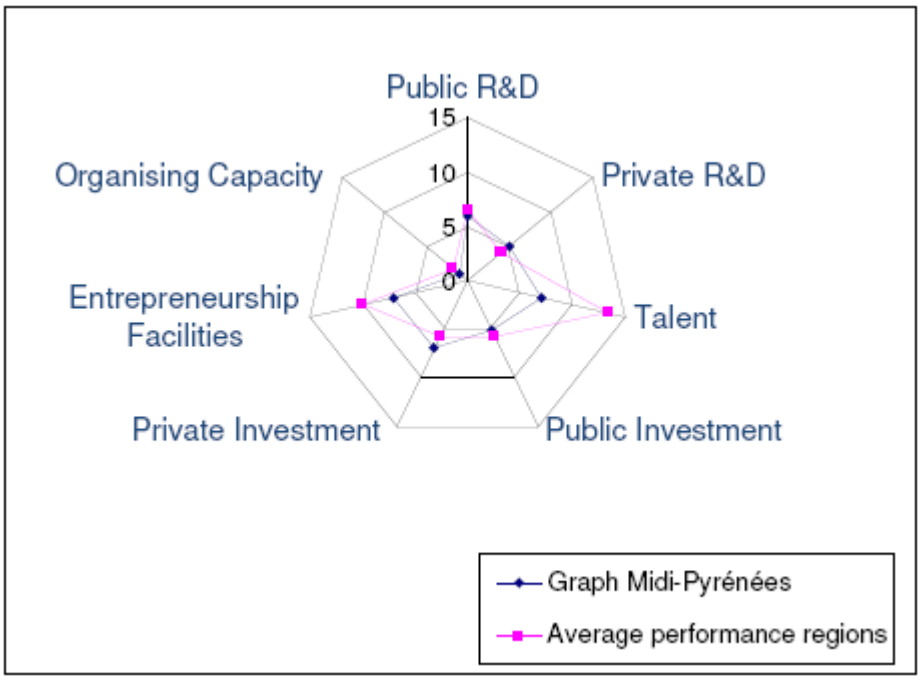
4. Ile-de-France



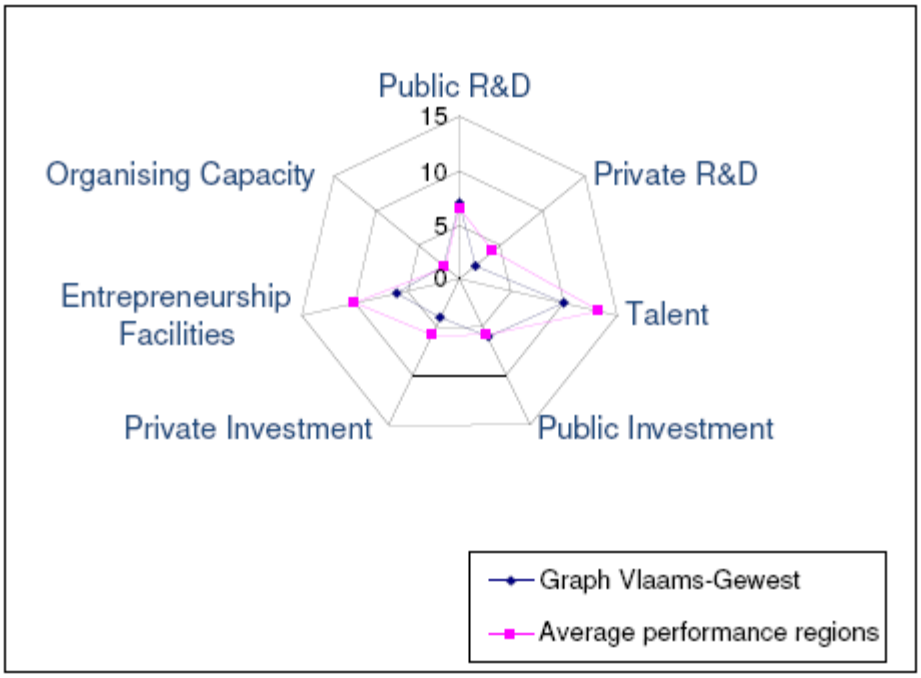
5. South-East



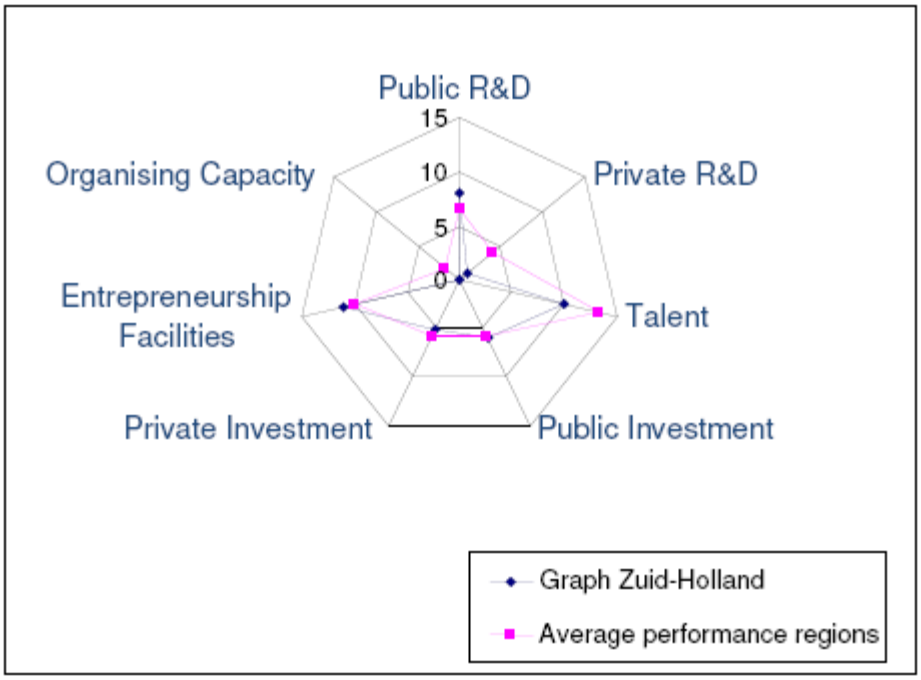
6. Midi-Pyrénées



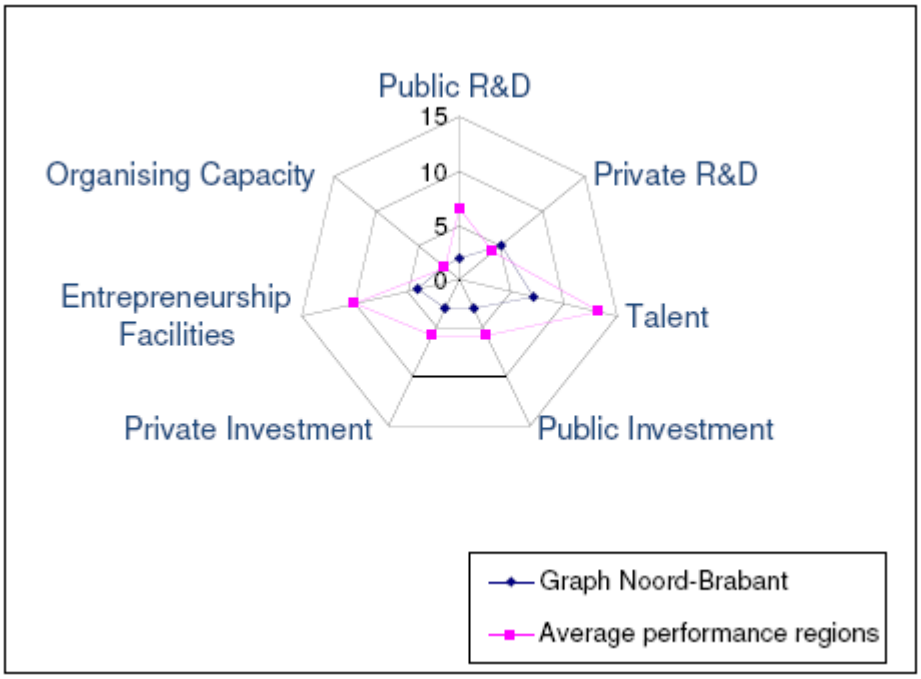
7. Vlaams Gewest



8. Zuid-Holland



9. Noord-Brabant



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